

WHAT IS CLAIMED IS:

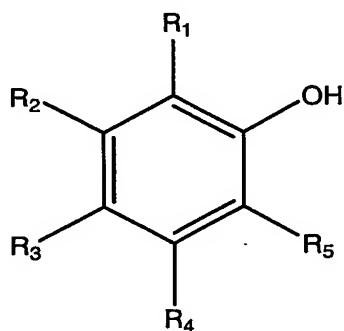
1. A pipe capable of obtaining an F time in Jana Laboratories Procedure APTF-2 of at least 1000 hours, under the following conditions pH 6.8 (± 0.1); Chlorine 4.1 mg/L (± 0.1); Nominal ORP 830mV; fluid temperature 110°C (± 1); air temperature 110°C (± 1); pressure 70 psig (± 1); flow rate 0.1 US gallons/min (± 10 percent); said pipe comprising polyethylene having a density greater than about 0.925 g/cc.

2. The pipe of Claim 1 wherein pipe comprises an antioxidant system comprising two or more components.

3. The pipe of Claim 2 wherein one of the antioxidant system components provides extraction resistance and another provides oxidation resistance.

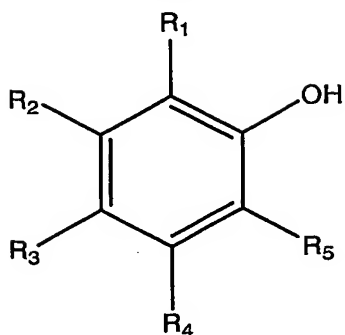
4. The pipe of Claim 3 wherein the antioxidant system includes at least one antioxidant from each of

a) a first class of antioxidants comprising a hindered phenols corresponding to the formula:



wherein R₁ and R₅ can independently be -CH₃, -CH(CH₃)₂, or -C(CH₃)₃, and R₂, R₃, and R₄ can independently be any hydrocarbon or substituted hydrocarbon group; and wherein the antioxidant from the first class is characterized as being more than five percent soluble in a hexane solution at 20°C, and further characterized by having its hydrolyzed product being more than five percent soluble in a hexane solution at 20°C; and

b) a second class of antioxidants comprising a hindered phenols corresponding to the formula:



wherein R_1 and R_5 can be $-\text{CH}_3$, $-\text{CH}(\text{CH}_3)_2$, or $-\text{C}(\text{CH}_3)_3$, and R_2 , R_3 , and R_4 can independently be any hydrocarbon or substituted hydrocarbon group provided that R_2 , R_3 and R_4 are chosen such that the antioxidant does not contain the moiety $\text{Ph}-\text{CHR}_6-\text{Ph}$, where Ph represents a phenyl ring and R_6 can be H or a phenyl ring.

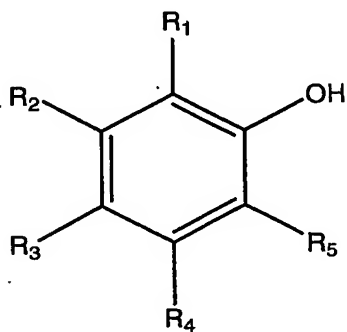
5 The pipe of Claim 4 wherein two or more antioxidants are selected from the group consisting of Irganox 1010; Irganox 1330; and Irganox 1076

6 The pipe of Claim 4 wherein the antioxidant system further comprises Irgafos 168.

10 7. A pipe comprising reactor grade polyethylene having a density greater than about 0.925 g/cc capable of obtaining an F time in Jana Laboratories Procedure APTF-2 of at least 1200 hours.

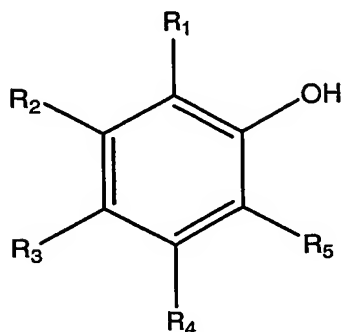
8. The pipe of claim 7 wherein the pipe further comprises at least one antioxidant from each of

15 a) a first class of antioxidants comprising a hindered phenols corresponding to the formula:



wherein R_1 and R_5 can independently be $-\text{CH}_3$, $-\text{CH}(\text{CH}_3)_2$, or $-\text{C}(\text{CH}_3)_3$, and R_2 , R_3 , and R_4 can independently be any hydrocarbon or substituted hydrocarbon group; and
20 wherein the antioxidant from the first class is characterized as being more than five percent soluble in a hexane solution at 20°C, and further characterized by having its hydrolyzed product being more than five percent soluble in a hexane solution at 20°C; and

b) a second class of antioxidants comprising a hindered phenols corresponding to the formula:



wherein R_1 and R_5 can be $-CH_3$, $-CH(CH_3)_2$, or $-C(CH_3)_3$, and R_2 , R_3 , and R_4 can

- 5 independently be any hydrocarbon or substituted hydrocarbon group provided that R_2 , R_3 and R_4 are chosen such that the antioxidant does not contain the moiety $Ph-CHR_6-Ph$, where Ph represents a phenyl ring and R_6 can be H or a phenyl ring.

9. The pipe of Claim 8 wherein the polyethylene is multimodal.

10. The pipe of Claim 8 wherein the density is greater than 0.940

- 10 11. The pipe of Claim 8 wherein the polyethylene resin further comprises one or more metal deactivators.

12. The pipe of Claim 8 wherein the polyethylene resin further comprises one or more phosphorous based stabilizer.

13. The use of a pipe as in Claim 8 for chlorinated hot water.

- 15 14. The pipe of Claim 1 in which the F time is greater than 1200 hours.